Health Care Delivery

Costs of Care Provided by Trainees in Internal Medicine and Family Practice

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Most adult patients currently receive their primary health care from family practitioners or internists. What impact this choice has had is not clear. In the past, comparisons have been made between care provided by internists and family practitioners. Using encounter data from the National Ambulatory Medical Care Survey,[1] Noren and co-workers were able to derive the average percentage of visits that generated laboratory and x-ray examinations. Of the internist visits, 73 percent generated laboratory studies, as compared with 34 percent of family practice visits. Internists spent on the average about five minutes longer with each patient.

Joel H. Merenstein, MD, Director of Research at St Margaret Memorial Hospital of Pittsburgh, reviewed charts from the offices of recently trained, board-certified, family practitioners and general internists practicing in southwestern Pennsylvania. Internists were found to order an average of 1.1 laboratory or x-ray tests per visit compared with 0.58 for the family practitioners (written communication, August 13, 1981). Nearly half of the internists' dispositions indicated that the patients should return for another scheduled visit. Over twice as many of the family practice visits ended without a specific return-appointment date. The referral rates were similar.

Smith and McWhinney[2] compared practice habits of internists and family practitioners using "programmed patients" (research assistants who gave predetermined answers to questions). The authors concluded that though there was no difference in the final diagnosis reached, the family practitioners asked fewer history questions, requested fewer items of data about the physical examination and ordered fewer laboratory investigations.

All of these studies have used either study populations or techniques that might tend to bias the results. Studying actual practices may present significant selection bias and skew the results. The use of sham or programmed patients would seem to solve this problem but enters the bias of an artificial test situation. A physician tends to respond with the answer he or she feels is expected, rather than follow the procedure that would be used in the office. The fallacy of this form of testing was demonstrated by Rose and colleagues,[3] who showed that internal medicine residents who responded on a test that certain routine screening procedures were indicated did not carry out or order these same tests in their actual practice.

To understand the differences in ordering and referral habits of family practitioners and internists, we randomly assigned new clinic patients to internal medicine or family practice trainees. In this way we were able to eliminate the self-selection biases of previous studies.

Methods

The University of California, Davis has family practice and internal medicine training programs. Each program runs a separate primary care outpatient clinic. The attending staff in the internal medicine clinic are full-time and community-based internists. The family practice clinic uses full-time and community-based family practitioners. New patients enter the system either from hospital discharge, emergency room or acute care clinic referrals or through self-referral. There is little or no formal communication between the two clinics; therefore, separate procedures are used for making appointments in each of the clinics.

During the randomization period, each patient who called for a new appointment was asked if he or she would object to being seen in either clinic. The charts of those patients having no objections were then reviewed by members of the faculty. Any patient who would not

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normally be an acceptable patient to either clinic was removed from the study (for example, obstetric and pediatric patients were not included in the study). Patients who had not previously been seen in either clinic and were acceptable as new patients to both clinics were then randomly assigned to one of the clinics and informed of their appointment time. Neither the patients nor the providers were aware that their charts were going to be retrospectively reviewed.

About seven months after the randomization, all of the charts were pulled and reviewed. A five-month period of time after the initial visit was examined. Charts were reviewed and evaluated for frequency of visits, laboratory studies ordered, number of referrals, acute care clinic visits, emergency room visits, hospital admission and form of follow-up. To verify adequate randomization, they were also compared for age, sex and race.

Results

In all, 100 patients were randomly assigned, 50 to each clinic. Eventually 27 patients were seen in each clinic. Using a chi-square analysis, no statistical difference was found in the age, race or sex of the patients assigned to either clinic.

A chi-square analysis of all the laboratory tests used in each clinic failed to show any significant differences. The total costs of laboratory tests per patient were compared. The average cost of laboratory tests per patient in the internal medicine clinic was \$117.96 (SD = 119.44). The average cost in the family practice clinic was \$113.40 (SD = 146.04).

To compare total cost of ambulatory care provided, a comparison of clinic visits, acute care visits (the nonacute emergency room) and consultations was carried out. The distribution of visits is outlined in Table 1. A chi-square analysis of these figures showed no significant difference. If prices are assigned to each visit, a total cost of physician care can be derived. The average cost for each type of visit was used to compute the total average expenditure per patient. The average cost of physician care over the five-month period, not including laboratory tests, was \$167.89 (SD = 102.23) in the internal medicine clinic and \$194.61 (SD = 144.37) in the family practice clinic. Using a Student's *t* test, this \$26.72 difference did not reach statistical significance.

The total cost of ambulatory care, physician and laboratory costs, not including pharmacy and other ancillary services, was \$288.43 (SD = 206.22) in internal medicine and \$306.73 (SD = 248.00) in family practice. This represents a statistically insignificant difference using a Student's *t* test. It is important to realize

TABLE 1.—*Patient Visits of 54 Patients During a Five Month Period*

	Internal Medicine (No. of Patients = 27)	*Family Practice (No. of Patients = 27)*
Clinic	60	65
Acute care	6	5
Consultations	12	15

that the sample sizes were small; large differences would have had to be present to show significance. To reach significance at a level of $P = .05$ with the sample sizes and standard deviation used, the difference in laboratory costs would have had to be \$70.81 and the total costs would have had to differ by \$132.29. Looked at in another fashion, for this small difference in cost to have been significant we would have needed a population of 7,881 patients for our study.

Conclusion

Selection bias has apparently played a significant role in previous efforts to compare practice costs and habits of internists and family practitioners. Unless the population of patients seen by the practitioners is randomly selected, it is of little value to compare the care provided. In this small randomized study it was shown that the cost of care was not significantly different between the two training sites. In previous studies, authors have often suggested that family practitioners order fewer laboratory tests. The difference in the cost of laboratory tests ordered in this study was less than 4 percent of the total cost of laboratory tests. The total cost difference for five months of ambulatory care by internists or family practitioners was 6 percent.

Because of the small sample size and the large standard deviations, it would be inappropriate to conclude that there is no difference in the cost of care provided by internists or family practitioners. However, even with these small numbers, the 50 percent differences reported by other authors would have reached significance. The study makes one look with suspicion upon nonrandomized studies that report large differences in the costs of care. Further large-scale randomized studies should be conducted in the near future. While we await the results of these studies it is premature to make long-term political, social and educational decisions about the direction of future primary health care based on the available data.

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